# Procedures for Maintaining the Texas Colonias Data

*An Outline of the Processes Used to Gather Information Into a Geodatabase*

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August 8, 2005

## I. Introduction

In collaboration with the U.S. Department of Housing and Development (HUD), Mexican Instituto Nacional de Estadística Geografía e Informática (INEGI), and the U.S. Geological Survey (USGS) in Austin, Texas and Tucson, Arizona have collected information about colonias along the United States/Mexico Border. The goal, as mentioned in USGS's Fact Sheet #2004-3070 is stated below:

> *"The Colonias Monitoring Program provides a publicly accessible, binational, GIS database to enable civic leaders and citizens to inventory, analyze, and monitor growth, housing, and infrastructure in border communities. High-technology tools are provided to support planning efforts and development along the border, using a sustainable and comprehensive approach. The collective information can be used by nongovernmental organizations in preparing grant and loan applications for community-improvement projects."*

Furthermore, colonias are defined by the same Fact Sheet as:

> *"HUD defines colonias as rural neighborhoods within 150 miles of the border that lack adequate infrastructure or housing, as well as other basic services. The colonias typically have high poverty rates, making it difficult for residents to pay for roads, sanitary-water and sewer systems, minimum-standard housing, street lighting, and other services. Colonias are scattered along the border as makeshift settlements, commonly on private land. Because these settlements have been established outside the formally sanctioned governance of nearby cities and towns, colonias residents have traditionally struggled to gain access to the public services available in those communities."*

Within Texas, the Office of Attorney General and the Texas Water Development Board implemented a colonias database during the 1990's. This database has provided an excellent foundation for monitoring colonias development. Unfortunately the cost of maintaining this database for over 1,400 colonias in Texas is cost prohibitive. This document describes a method to use local government data to maintain the database efficiently.

## II. Short History of Texas Colonia Regulations

In Texas there are more than 1,400 colonias, located primarily along the state's 1,248 mile border with Mexico. In 1990 the US Congress passed the Cranston-Gonzalez Affordable Housing Act, which stipulated that 10% of all Housing and Urban

Development Community Development Block Grants be awarded to colonias project development in the US/Mexico Border states. Currently the Office of Rural Community Affairs (ORCA) administers the CDBG funding for colonias in Texas. Grants are awarded to units of local government that carry out development activities.

In 1989, the Texas Legislature passed Senate Bill 2 to avoid future development of colonias in Texas. Senate Bill 2 established the Economically Distressed Area Program (EDAP), administered by the Texas Water Development Board. EDAP assistance grants can be obtained for communities with inadequate water or sewer systems, located in counties with 25% unemployment and per capita income 25% below state average. The second element of Senate Bill 2 is the enforcement of Model Subdivision Rules (MSR), which must be adopted and enforced to receive EDAP funding. The MSR require that new subdivisions of land subdivided into tracts of five acres of less must provide adequate water and sewer infrastructure. MSR regulations apply to all subdivisions created after county adoption of the rules. The Office of Attorney General for the State of Texas (OAG) maintains a list of eligible counties which includes all counties within 50 miles of the border, and also maintains current information on the web pertaining to colonia prevention laws.

Due to the nature of financing colonia lots, few residents have property titles. Instead the developers offer a Contract for Deed to the purchaser of the lot until the loan has been paid off or until foreclosure. In 1995, Texas Legislature passed Senate Bill 336 which restricts the recession and foreclosure clauses and requires new disclosure and bi-lingual availability of transactional documents for all Contract for Deed legal affairs. In addition Senate Bill 336 provided for the adoption of conversion of the Contract for Deed to a mortgage once 40% of the purchase price or 48 monthly installments have been paid off. This greatly reduced the number of foreclosures. The Texas Department of Housing and Community Affairs maintains current information on the Contract for Deed conversion program.

## III. Summary of Methodology

In cooperation with the Texas Water Development Board's (TWDB) Economically Depressed Areas Program, the Texas OAG defined the boundaries of the colonias in Texas and started a database concerning water and wastewater services for each colonia. Much of this work was accomplished during the late 1990's and early 2001. The TWDB contracted out to the private sector to update the water and wastewater database and published this data in 2003. Much of this data needs updating to reflect funding of community infrastructure projects and to monitor the illegal growth of colonias.

In collaboration with the Texas OAG, the USGS has been developing new methods to incorporate local government data to update the colonias database. County appraisal districts and utility districts are beginning to maintain their databases in a geospatial digital format. The appraisal districts have boundaries, plat information, and occupied lots for each of the subdivisions in the county. Many of these subdivisions match up to the colonias designated by the Texas OAG. Local water and wastewater

utility districts at the minimum maintain current information on utility availability for each of the colonias. In some counties, such as El Paso, the actual water and sewer lines are maintained in the utility geodatabase. Therefore these new methods are taking advantage of local government standard business practices to maintain and update the colonias database.

The USGS and Texas OAG chose Maverick County, Texas as a pilot county to test these new processes. Maverick County was chosen due to the following reasons:

1. Border county that contains colonias as defined by HUD and OAG
2. Smaller colonia count ( approximately 69) makes the data easier to manage as the processes are tested.
3. Rural county that has adopted geospatial business practices for their appraisal districts.

Since the methods have been applied to the pilot, the procedures are being applied to colonias in El Paso and Hidalgo county.

## IV. Gathering the Data

The goal is to focus on harvesting data from local government resources, rather than recreating the data. The original colonias were identified by the Texas OAG. For more information on the OAG's project, please visit http://maps.oag.state.tx.us/colgeog/index.htm. Later the TWDB added additional data items for their use in prioritizing water and wastewater infrastructure grants. Much of this additional database information is difficult to maintain. The OAG and the USGS have determined a list of essential database items that may be collected by local and state government as part of their standard business practices. The following tables summarize these items and pair them with a potential source agency. Since the OAG and HUD have similar interests, this data can be of value to both organizations.

### A. Identification Information

| Data | Data Source |
|---|---|
| Colonia Name | County Appraisal District |
| Alternative Names (if any) | County Appraisal District |
| Colonia Boundaries | County Appraisal District |

### B. Platting Information

| Data | Data Source |
|---|---|
| Is the colonia platted? | OAG and County Appraisal District |
| If Yes, has the plat been recorded? | OAG and County Appraisal District |
| If Yes, when was the plat recorded? | OAG and County Appraisal District |
| If Yes, what is the plat volume/page? | OAG and County Appraisal District |

| | |
|---|---|
| If No, does a map exist? | OAG and County Appraisal District |
| If No, when was the community first established? | OAG and County Appraisal District |

## C. Infrastructure Information

| Data | Data Source |
|---|---|
| **Water information** | |
| Is Potable water available in the colonia? | County Utilities Office |
| If Yes, what percentage of dwellings has a public water supply? | County Utilities Office |
| If Yes, what Percentage of dwellings has potable water wells? | County Utilities Office |
| **Wastewater Information** | |
| Is adequate wastewater disposal available in the colonia? | County Utilities Office |
| If Yes, what percentage of dwellings has an adequate legal sewer system? | County Utilities Office |
| If Yes, what percentage of dwellings has an adequate legal septic system? | County Utilities Office |
| Are there lots not served by adequate wastewater disposal? | County Utilities Office |
| If Yes, what percentage of dwellings has no adequate sewer or septic systems? | County Utilities Office |
| If Yes, what percentage of dwellings with no adequate sewer or septic systems is suitable for septic service? | County Utilities Office |
| **Electricity Information** | |
| Does the community have electric service? | County Utilities Office |
| If Yes, does the community's electrical network meet generally accepted standards? | County Utilities Office |
| **Housing Information** | |
| How many lots are in the colonia? | County Appraisal District |
| How many lots in the colonia are occupied? | County Appraisal District |
| What percentage of homes in the colonia appears to be in need of housing rehabilitation or reconstruction? | Secretary of State – Colonia Ombudsman? |
| What percentage are safe, and sanitary housing? | Secretary of State – Colonia Ombudsman? |
| **Roads Information** | |
| Are streets and roads paved? | Texas Dept of Transportation |

| | |
|---|---|
| If Yes, what percentage of roads are paved? | Texas Dept of Transportation |
| Are access roads from the colonia to public roads paved? | Texas Dept of Transportation |
| Are the streets and roads passable in all weather conditions? | Texas Dept of Transportation |
| Is the area accessible by emergency vehicles? | Texas Dept of Transportation |
| **Telephone Information** | |
| Is land based telephone service available? | Secretary of State – Colonia Ombudsman? |
| Is cellular telephone service available? | Secretary of State – Colonia Ombudsman? |
| **Drainage** | |
| Is drainage adequate? | Secretary of State – Colonia Ombudsman |
| Is any part of the colonia in a flood plain? | FEMA DFIRM maps |
| If Yes, what percentage of the dwellings is in the flood plain? | FEMA DFIRM maps |

**D. Services Information**

| | |
|---|---|
| **Health Care Information** | |
| Is there a hospital in the county? | Texas Department of State Health Services |
| The nearest hospital is "_____" | Texas Department of State Health Services |
| The nearest hospital is "__" miles away. | Texas Department of State Health Services |
| Is there an emergency clinic/rural clinic/federally qualified health center in the county? | Texas Department of State Health Services |
| If Yes, the nearest clinic/health center is "__" miles away. | Texas Department of State Health Services |
| If Yes, what type of clinic/health center is available? | Texas Department of State Health Services |
| Are emergency medical services available in this area? | Texas Department of State Health Services |
| **Solid Waste Disposal** | |
| Is trash collection available in the colonia? | Secretary of State – Colonia Ombudsman? |

## E. Financial Information

| Data | Data Source |
|---|---|
| Is there a financial guarantee or means for water/wastewater construction? | Texas Water Development Board? |

## F. Projects Information

| Data | Data Source |
|---|---|
| Has this community been the recipient of projects to improve infrastructure or services? | Texas Water Development Board? |
| If Yes, please describe. | Texas Water Development Board? |

## V. Storing the Data

A simple geodatabase was designed to store this data. It provides a means to store the information in a manner that is easily updated, but at the same time spatially viewable. Thus, we can overlay the colonia boundaries on a Digital Orthophoto Quadrangle (DOQ) mosaic of Maverick County. This allows us to perform all sorts of analyses, such as verifying the defined border colonias or determining the nearest school/hospital. Section IV of this document will explain the analyses that have been done in more detail.

The screenshots below illustrate the capacity of the geodatabase's ability to communicate information effectively.

**Screenshot #1:** The Colonia boundaries as it appears in ArcMap.

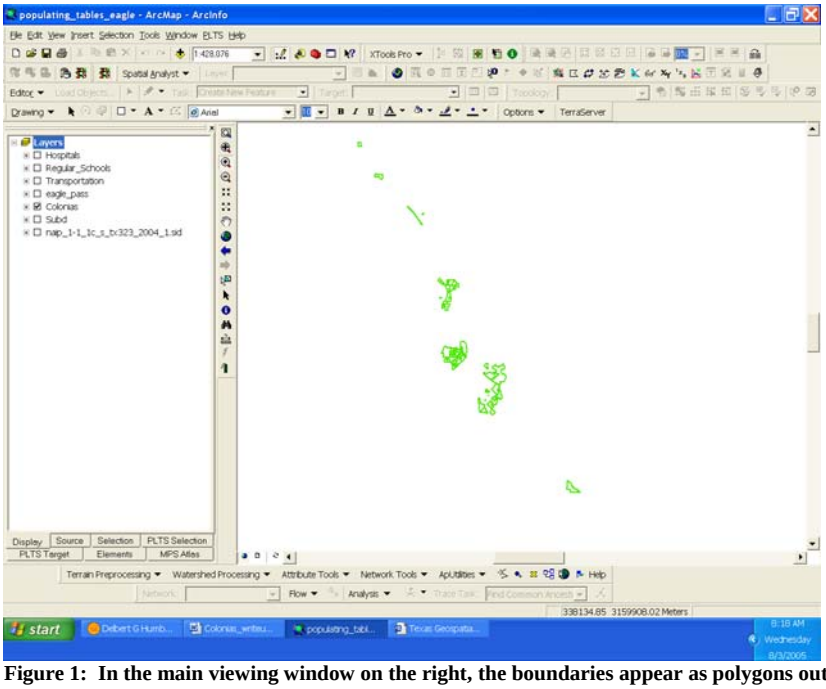



**Figure 1: In the main viewing window on the right, the boundaries appear as polygons outlined in green.**

**Screenshot #2:** Now we can pull in other layers to give it more meaning. In this example, we use a DOQ of Maverick County, Tx. Healthy green vegetation appears red in the DOQ since part of the image is composed from near-infrared imagery.

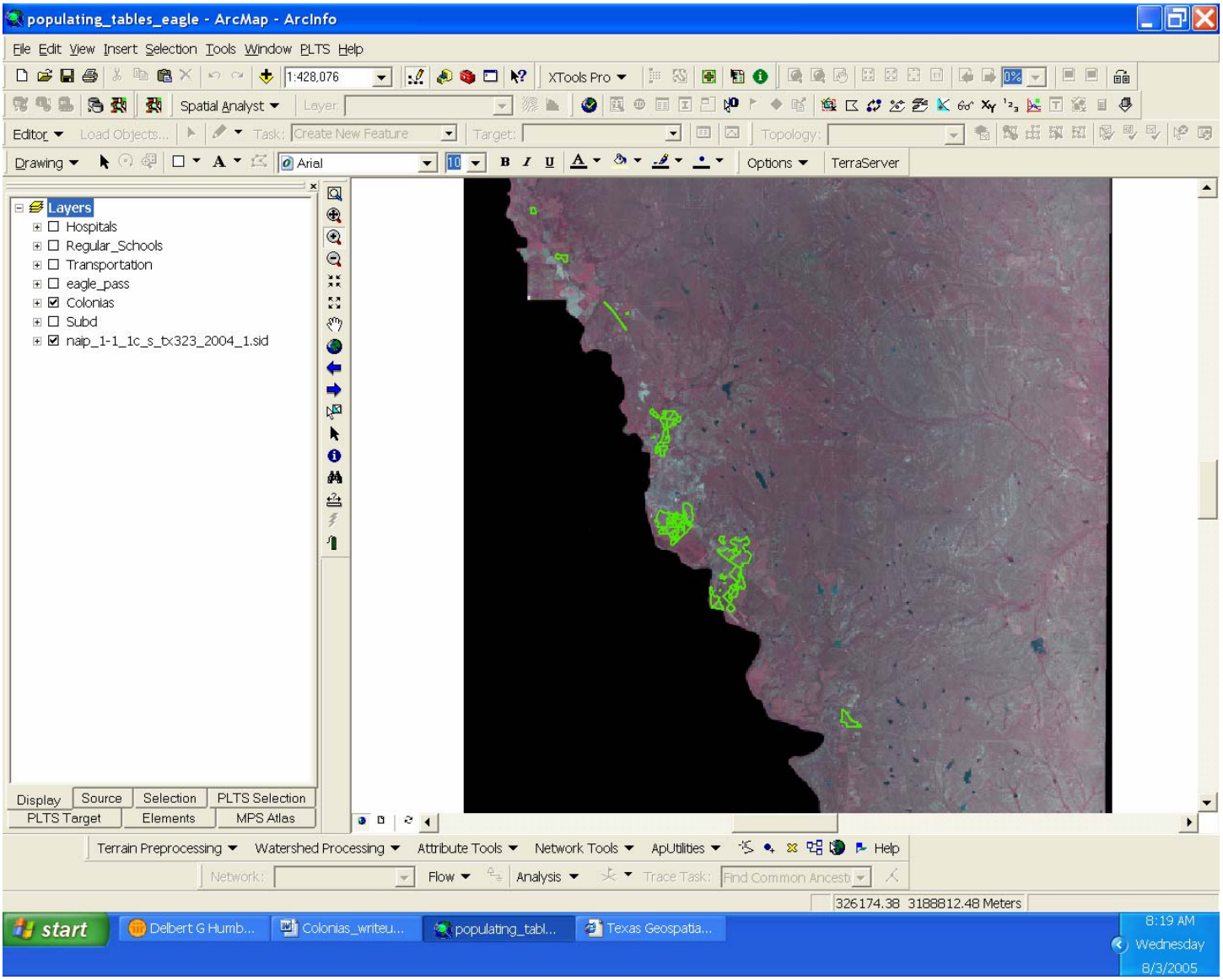



**Figure 2: In this air photo, you can see Eagle Pass, Texas sandwiched in between the colonias near the middle section of the western border. The grayish hues of urban development give away the city's location.**

**Screenshot #3:** Let's zoom in for a more meaningful look, and at the same time lets pull in some layers containing school and hospital locations.

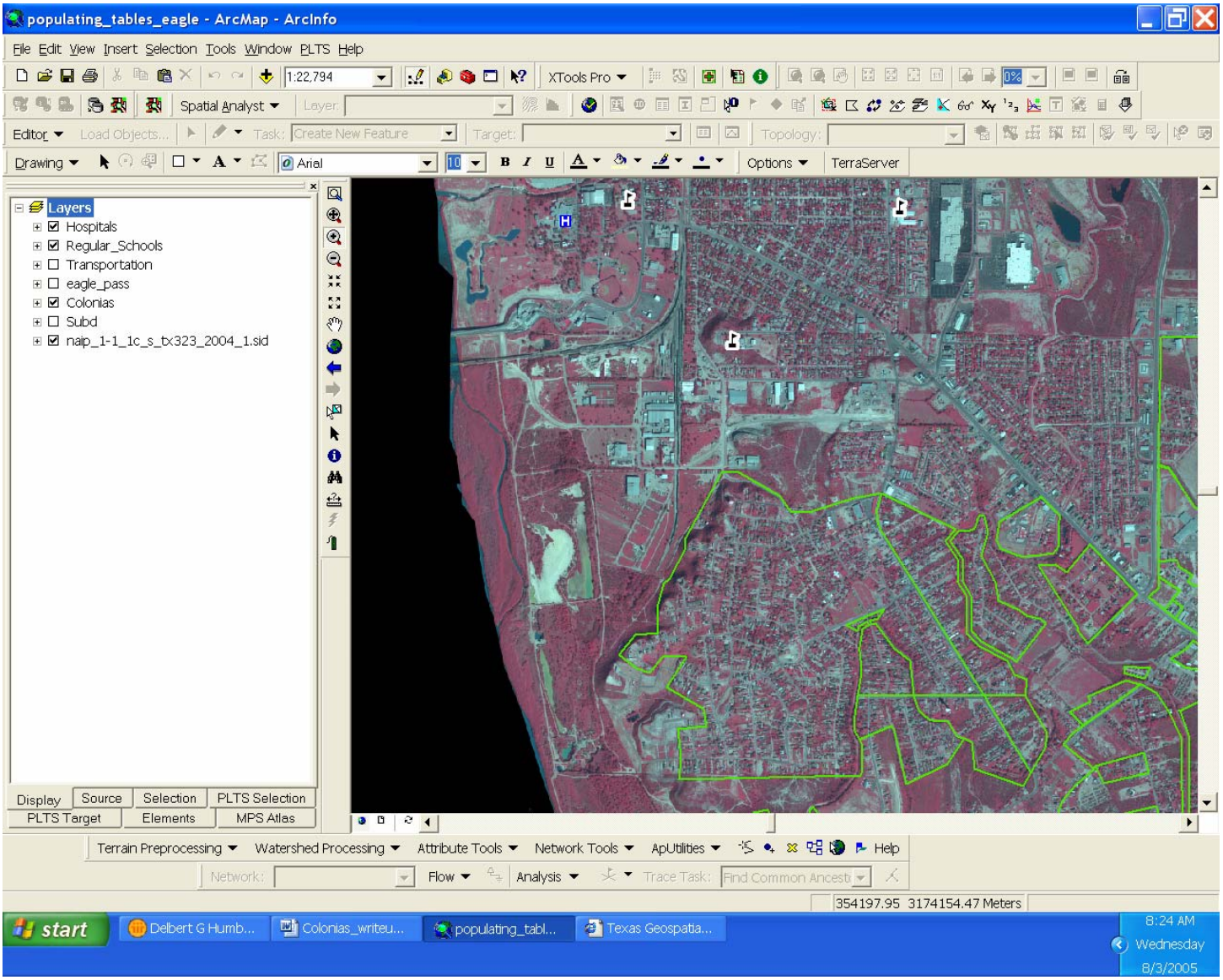



**Figure 3: This is just south of Eagle Pass, you can see some schools marked by the black flags outlined in white, and a hospital marked by the letter "H" outlined in blue. You can also begin to see individual lots within the colonias.**

**Screenshot #4:** Zooming in even further reveals more details within the colonia. We will also use ArcMap's identify tool to see what other information is stored within the geodatabase.

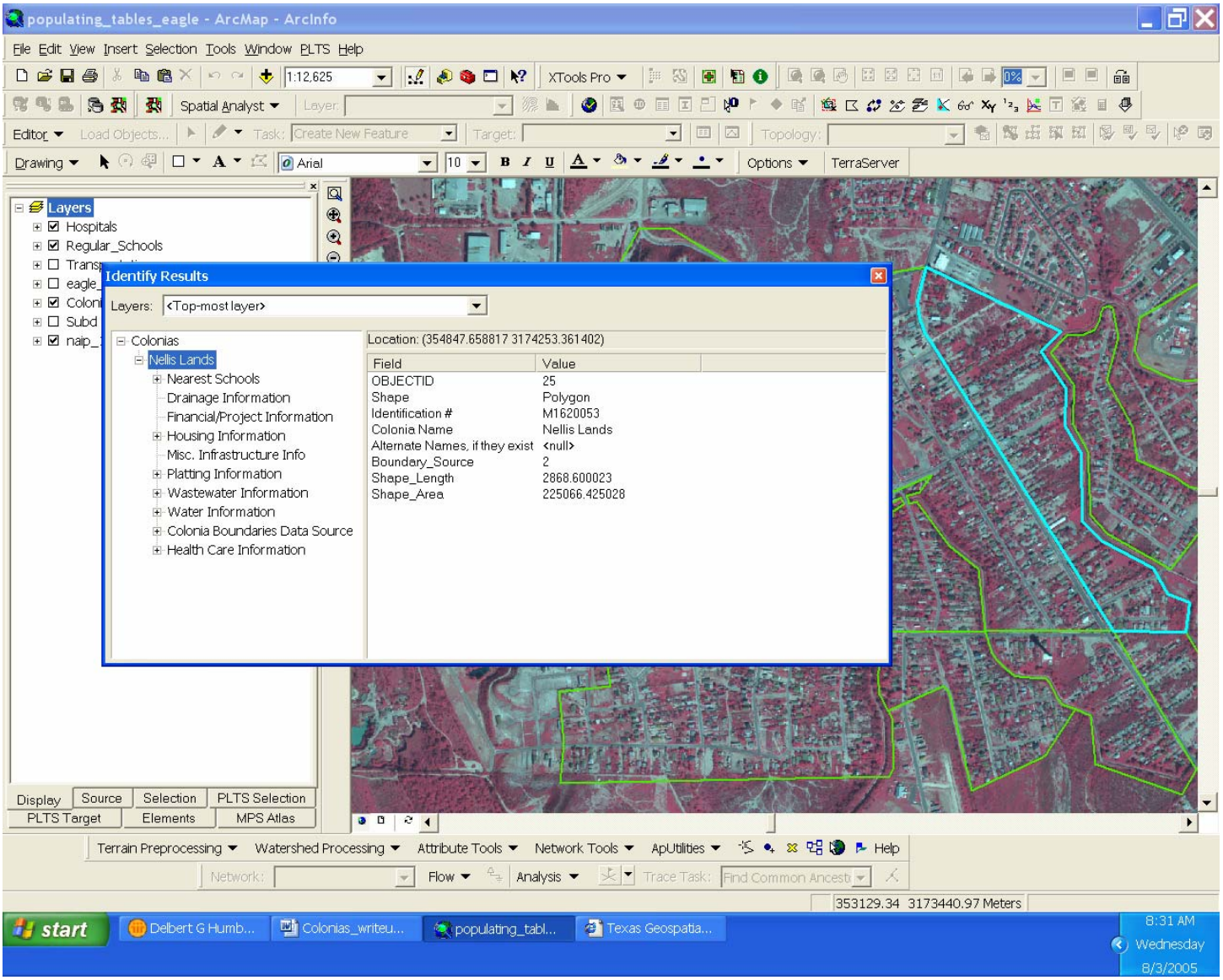



**Figure 4: The colonia selected for identification is outlined in blue, near the right side of the screenshot. In the "Identify Results" window we see the colonia name, "Nellis Lands". On the right side of the window is more information regarding its Identification. On the left side of the window, we see more information to choose from in regards to this colonia. This list includes options such as "Nearest Schools", "Housing Information", and "Health Care Information".**

**Screenshot #5:** Clicking on the "Housing Information" option yields the following results.

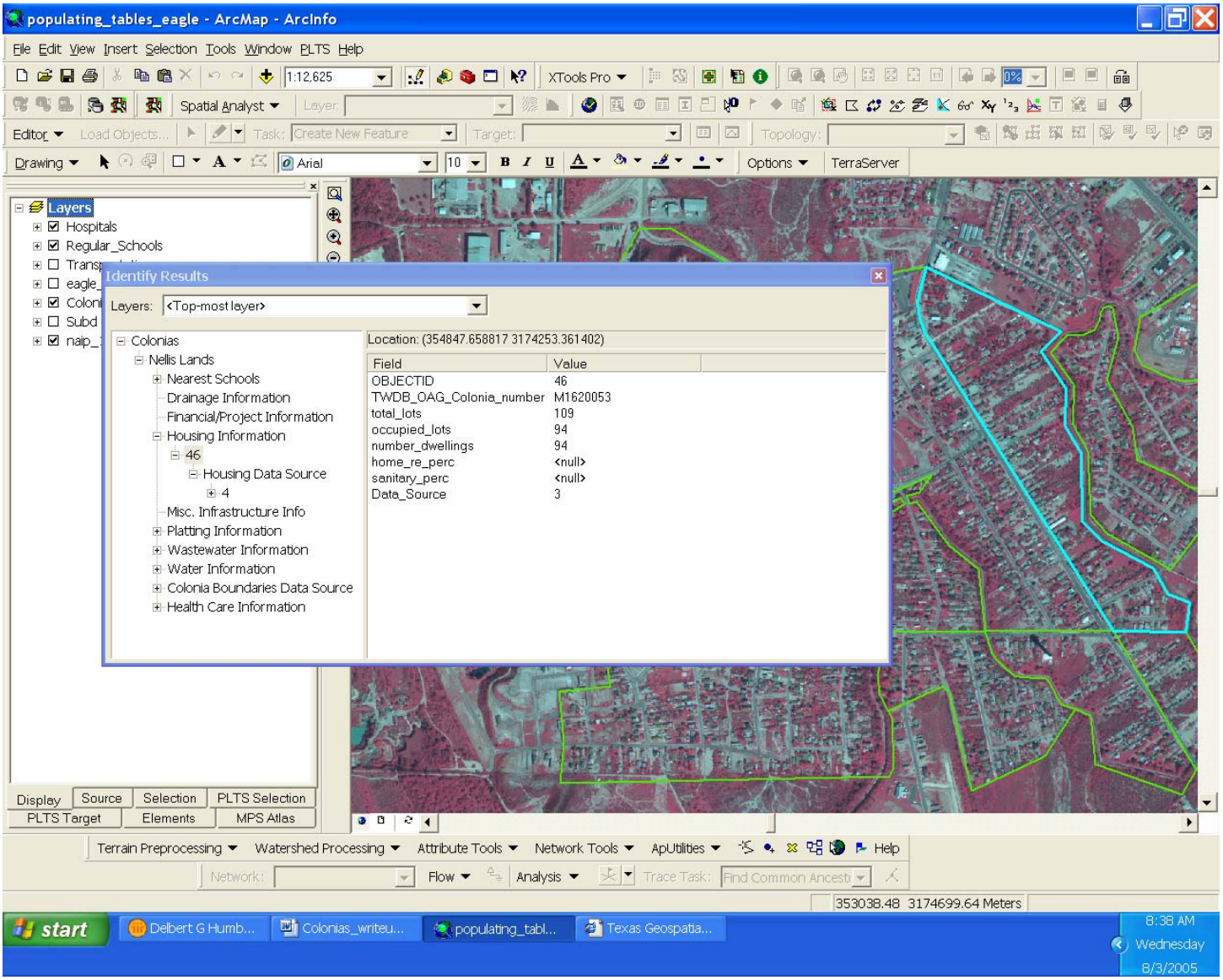



**Figure 5: In the "Identify Results" window, we see that this colonia has approximately 109 total lots, an estimated 94 of which are occupied. Clicking on the "Housing Data Source" option will reveal that the source of the housing data is the Maverick County Appraisal District. Expanding other sections in the "Identify Results" window will reveal their respective data and data sources.**

**Screenshot #6:** Other layers can be pulled in, such as roads, for other analyses.

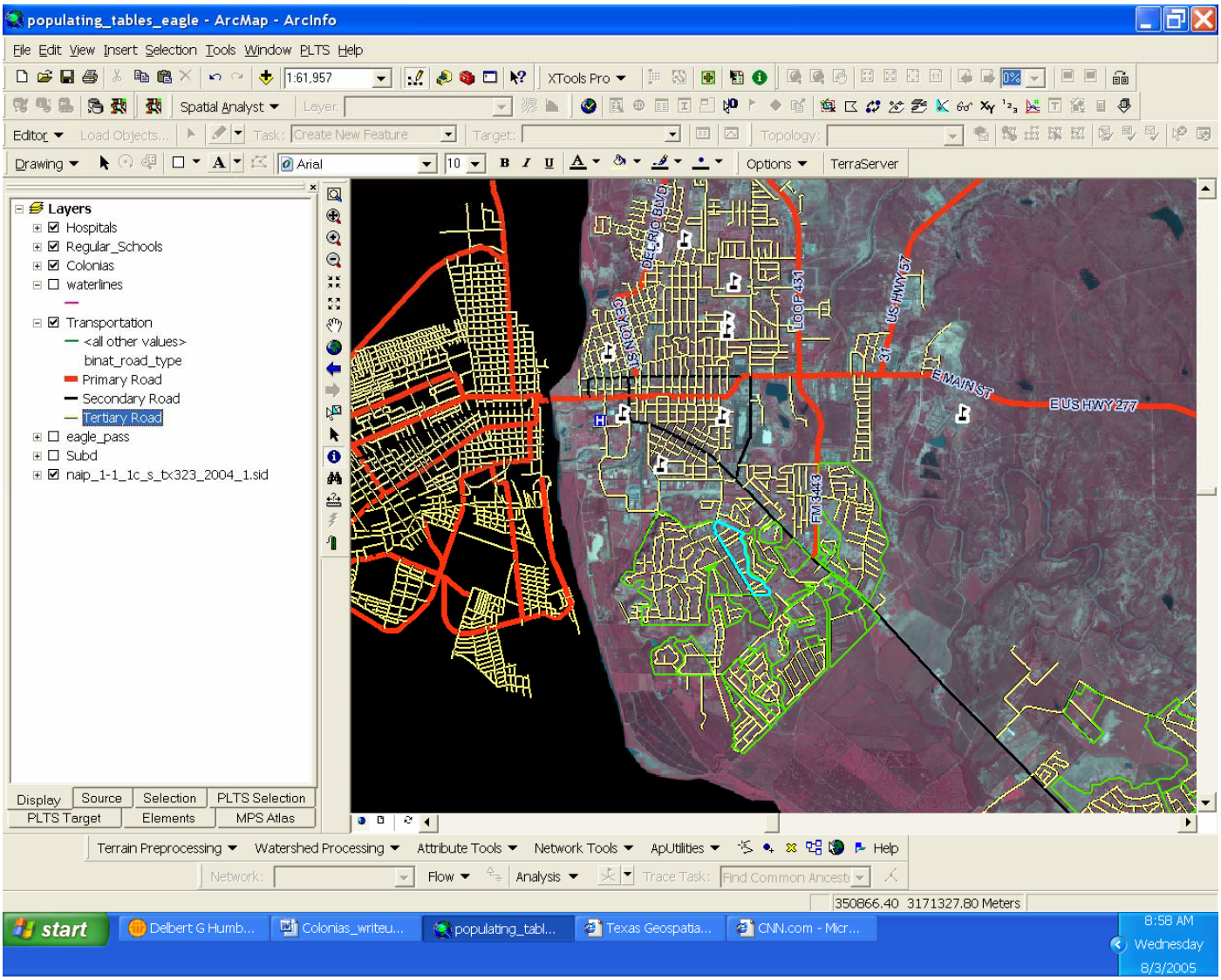



**Figure 6: Primary roads marked in red, secondary in black, tertiary in yellow. Colonias are still outlined in green.**

As these screenshots have illustrated, a geodatabase is an optimal storage medium for the colonias' data. Its relational database structure allows data to be entered in either Microsoft Access or ArcMap. You can use either the traditional database table view (MS Access/ArcMap), or the "Attrbutes" window (ArcMap only). Information can be retrieved in table format, or via the "Identify Results" window. More importantly, the geodatabase allows users to pull in any relevant GIS data to their studies as well as view the data spatially.

## VI. Methods

### A. Verifying the Colonia Boundaries

When the original colonia boundaries were created, they were done using a combination of paper plat maps and electronic EMS 911 maps. First, the plat maps were used to create the proper shape of the colonia, then the EMS 911 maps were used to georeference the shapes. However, with the new 2005 DOQs, inaccuracies in the colonia locations were revealed. When updating the colonia boundaries, the following guidelines were used:

1. Does the boundary appear to line up with the lots seen on the DOQ?

2. If the boundary lined up, it was left alone. However, if it did not, it was moved around manually until a best fit was determined.

3. If the best fit still did not fit, then boundaries obtained from local appraisal districts were used as a guide for manipulating the original boundaries.

**Screenshot #7:** Scenario that follows guideline #2 above.

**Figure 7: In these images, the pink outlines are the original boundaries defined by the OAG. The Green outlines are updated boundaries. The blue and yellow circles in the top image identify areas where the boundaries are not in the correct location. For example, the blue circle indicates a boundary that intersects with a large building. The yellow circle shows a boundary that cuts through the middle of a house. In the bottom image, the blue and yellow circles delineate where these areas have moved after the boundaries have been manually moved to a best fit location.**

**Screenshot #8:** Scenario that follows guideline #3 above.

**Figure 8a:**
**In the top image, the original red outline for the colonia named, "Border Housing Unit #1" is completely misaligned. Moreover, although it can be moved manually, there doesn't appear to be a set of lots that coincide perfectly with it.**


**Figure 8b:**
**The bottom image shows the local appraisal district boundaries for the same area overlaid on the same DOQ. The area labeled "Border Ho" by the appraisal district has a much better fit than the original. After conversing with the OAG, it was decided that these boundaries should be used instead. This is shown in the next screenshot.**

**Screenshot #9:** Overview of the process using the data in Screenshot #8.


**Figure 9: The new boundary (green) fits much better than the original boundary (pink) in the final image.**

In Maverick County, this process has proved invaluable; 67 out of the 69 colonias required a boundary adjustment in one form or another. In addition to the boundary locations, the Appraisal District data also differed in another manner. The two sets of data, OAG and local Appraisal District, did not always have the same colonia names. There are ~4 colonias in the OAG data that are nonexistent in the Appraisal District data. However, since the OAG and the HUD have similar definitions for a colonia, the OAG colonia names are used. In addition to using their naming convention, the original OAG colonia shapes were also preserved whenever possible. *This may change as the process evolves.*

In El Paso County, where much of this data has been gathered as well, the local Appraisal District was able to give us colonia boundaries as well as the individual lot boundaries within them. A conversation with them revealed how their boundaries are constantly changing due to land disputes or land deals. Thus, local involvement would prove to be not only beneficial, but absolutely necessary. It would be impossible for one central agency to keep up with these changes across the entire border. However, a central agency could collect the changes after a specified time period from local agencies easily.

## C. Water/Wastewater Information

The local utility company, Eagle Pass Utilities, was contacted to obtain information for water/wastewater. Initially, a simple excel table was designed that listed all the colonias in Maverick County, two fields asking whether or not water and wastewater were available, and a fourth field for special comments. This table has been refined to extract more information, including percentages of dwellings with sewer vs. septic service and water lines vs. water wells, and will be sent out to Hidalgo county soon. As the process evolves and the table becomes more polished, we will eventually have a standardized list to send out to all the counties along the border.

El Paso County, which has many GIS programs, was also able to provide us with GIS waterlines/waterline hookups/sewerlines data within colonia boundaries. This data would allow easy GIS analysis for counting the number of dwellings with utility access. However, for areas with little or no GIS capabilities, the excel table described in the paragraph before will suffice.

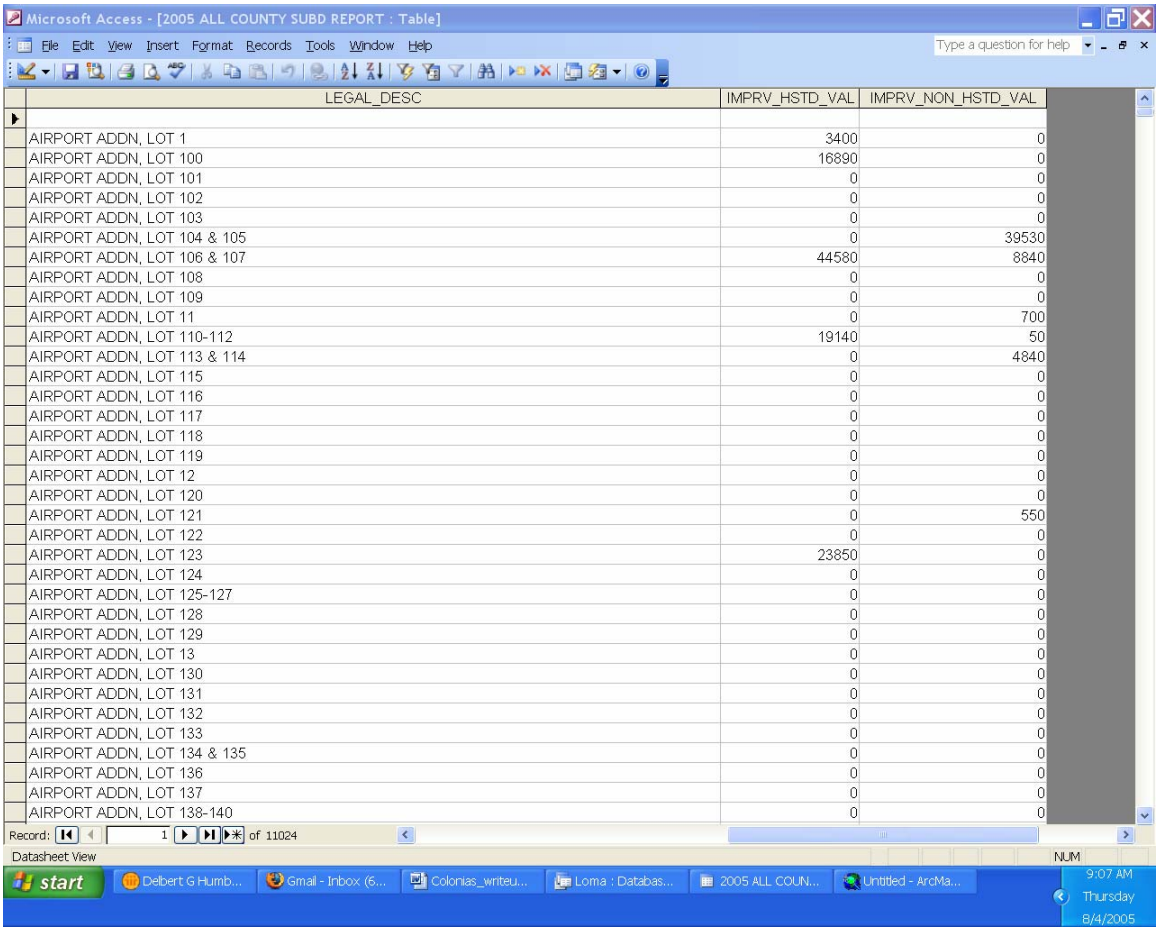
**Screenshot #12:**
El Paso waterline/sewerline data


**Figure 10: Sample shot of an El Paso Colonia (high resolution true color DOQ)**

## B. Gathering Housing Information

The Maverick County Appraisal District was also able to give us information regarding the number of lots and the number of occupied lots within a colonia. They have a database listing all the lots and their respective owners within the county. Moreover, they also have a field that lets us know if a dwelling exists on the property. Although this is not an explicit count, these data enable us to extrapolate one.

**Screenshot #10:** A sample of the database that was given.

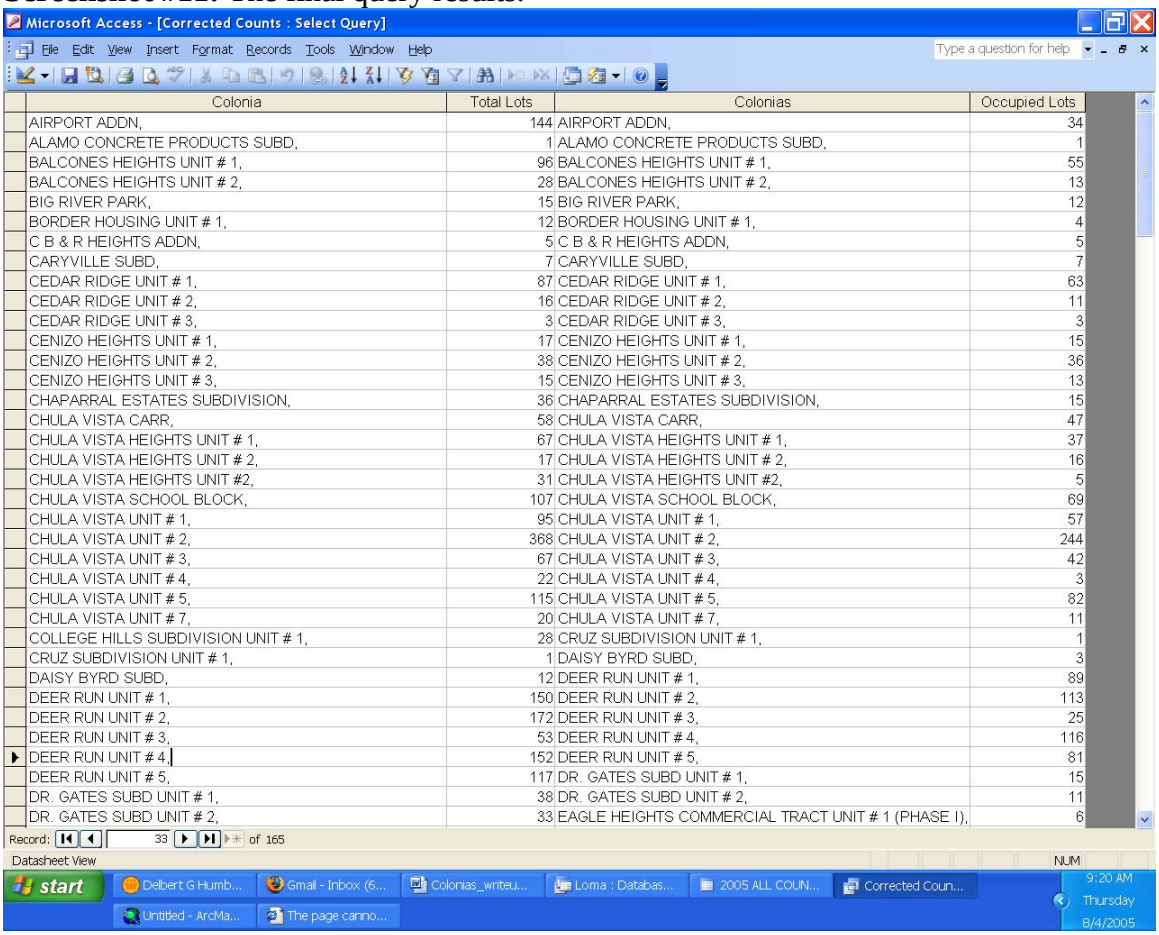



| LEGAL_DESC | IMPRV_HSTD_VAL | IMPRV_NON_HSTD_VAL |
|---|---|---|
| AIRPORT ADDN, LOT 1 | 3400 | 0 |
| AIRPORT ADDN, LOT 100 | 16890 | 0 |
| AIRPORT ADDN, LOT 101 | 0 | 0 |
| AIRPORT ADDN, LOT 102 | 0 | 0 |
| AIRPORT ADDN, LOT 103 | 0 | 0 |
| AIRPORT ADDN, LOT 104 & 105 | 0 | 39530 |
| AIRPORT ADDN, LOT 106 & 107 | 44580 | 8840 |
| AIRPORT ADDN, LOT 108 | 0 | 0 |
| AIRPORT ADDN, LOT 109 | 0 | 0 |
| AIRPORT ADDN, LOT 11 | 0 | 700 |
| AIRPORT ADDN, LOT 110-112 | 19140 | 50 |
| AIRPORT ADDN, LOT 113 & 114 | 0 | 4840 |
| AIRPORT ADDN, LOT 115 | 0 | 0 |
| AIRPORT ADDN, LOT 116 | 0 | 0 |
| AIRPORT ADDN, LOT 117 | 0 | 0 |
| AIRPORT ADDN, LOT 118 | 0 | 0 |
| AIRPORT ADDN, LOT 119 | 0 | 0 |
| AIRPORT ADDN, LOT 12 | 0 | 0 |
| AIRPORT ADDN, LOT 120 | 0 | 0 |
| AIRPORT ADDN, LOT 121 | 0 | 550 |
| AIRPORT ADDN, LOT 122 | 0 | 0 |
| AIRPORT ADDN, LOT 123 | 23850 | 0 |
| AIRPORT ADDN, LOT 124 | 0 | 0 |
| AIRPORT ADDN, LOT 125-127 | 0 | 0 |
| AIRPORT ADDN, LOT 128 | 0 | 0 |
| AIRPORT ADDN, LOT 129 | 0 | 0 |
| AIRPORT ADDN, LOT 13 | 0 | 0 |
| AIRPORT ADDN, LOT 130 | 0 | 0 |
| AIRPORT ADDN, LOT 131 | 0 | 0 |
| AIRPORT ADDN, LOT 132 | 0 | 0 |
| AIRPORT ADDN, LOT 133 | 0 | 0 |
| AIRPORT ADDN, LOT 134 & 135 | 0 | 0 |
| AIRPORT ADDN, LOT 136 | 0 | 0 |
| AIRPORT ADDN, LOT 137 | 0 | 0 |
| AIRPORT ADDN, LOT 138-140 | 0 | 0 |

**Figure 11: In the above screenshot, one can see the name of the subdivision (colonia) a lot belongs to, the lot's number, and whether or not an improvement (dwelling) has been made to the property. The "Legal_Desc" field shows the colonia/lot number. Both the "Imprv_Hstd_Val" and the "Imprv_Non_Hstd_Val" show that a dwelling exists if either value is greater than zero.**

A database query was written to parse out the "LEGAL_DESC" field into new fields. The first field contained only the colonia name, the next field had the lot number. This made it easy to create another query that would list the number of total lots per colonia. A third query was created to count the number of occupied lots per colonia. The combined results appear as (next page):

**Screenshot #11:** The final query results.




| Colonia | Total Lots | Colonias | Occupied Lots |
|---|---|---|---|
| AIRPORT ADDN, | 144 | AIRPORT ADDN, | 34 |
| ALAMO CONCRETE PRODUCTS SUBD, | 1 | ALAMO CONCRETE PRODUCTS SUBD, | 1 |
| BALCONES HEIGHTS UNIT # 1, | 96 | BALCONES HEIGHTS UNIT # 1, | 55 |
| BALCONES HEIGHTS UNIT # 2, | 28 | BALCONES HEIGHTS UNIT # 2, | 13 |
| BIG RIVER PARK, | 15 | BIG RIVER PARK, | 12 |
| BORDER HOUSING UNIT # 1, | 12 | BORDER HOUSING UNIT # 1, | 4 |
| C B & R HEIGHTS ADDN, | 5 | C B & R HEIGHTS ADDN, | 5 |
| CARYVILLE SUBD, | 7 | CARYVILLE SUBD, | 7 |
| CEDAR RIDGE UNIT # 1, | 87 | CEDAR RIDGE UNIT # 1, | 63 |
| CEDAR RIDGE UNIT # 2, | 16 | CEDAR RIDGE UNIT # 2, | 11 |
| CEDAR RIDGE UNIT # 3, | 3 | CEDAR RIDGE UNIT # 3, | 3 |
| CENIZO HEIGHTS UNIT # 1, | 17 | CENIZO HEIGHTS UNIT # 1, | 15 |
| CENIZO HEIGHTS UNIT # 2, | 38 | CENIZO HEIGHTS UNIT # 2, | 36 |
| CENIZO HEIGHTS UNIT # 3, | 15 | CENIZO HEIGHTS UNIT # 3, | 13 |
| CHAPARRAL ESTATES SUBDIVISION, | 36 | CHAPARRAL ESTATES SUBDIVISION, | 15 |
| CHULA VISTA CARR, | 58 | CHULA VISTA CARR, | 47 |
| CHULA VISTA HEIGHTS UNIT # 1, | 67 | CHULA VISTA HEIGHTS UNIT # 1, | 37 |
| CHULA VISTA HEIGHTS UNIT # 2, | 17 | CHULA VISTA HEIGHTS UNIT # 2, | 16 |
| CHULA VISTA HEIGHTS UNIT #2, | 31 | CHULA VISTA HEIGHTS UNIT #2, | 5 |
| CHULA VISTA SCHOOL BLOCK, | 107 | CHULA VISTA SCHOOL BLOCK, | 69 |
| CHULA VISTA UNIT # 1, | 95 | CHULA VISTA UNIT # 1, | 57 |
| CHULA VISTA UNIT # 2, | 368 | CHULA VISTA UNIT # 2, | 244 |
| CHULA VISTA UNIT # 3, | 67 | CHULA VISTA UNIT # 3, | 42 |
| CHULA VISTA UNIT # 4, | 22 | CHULA VISTA UNIT # 4, | 3 |
| CHULA VISTA UNIT # 5, | 115 | CHULA VISTA UNIT # 5, | 82 |
| CHULA VISTA UNIT # 7, | 20 | CHULA VISTA UNIT # 7, | 11 |
| COLLEGE HILLS SUBDIVISION UNIT # 1, | 28 | CRUZ SUBDIVISION UNIT # 1, | 1 |
| CRUZ SUBDIVISION UNIT # 1, | 1 | DAISY BYRD SUBD, | 3 |
| DAISY BYRD SUBD, | 12 | DEER RUN UNIT # 1, | 89 |
| DEER RUN UNIT # 1, | 150 | DEER RUN UNIT # 2, | 113 |
| DEER RUN UNIT # 2, | 172 | DEER RUN UNIT # 3, | 25 |
| DEER RUN UNIT # 3, | 53 | DEER RUN UNIT # 4, | 116 |
| DEER RUN UNIT # 4, | 152 | DEER RUN UNIT # 5, | 81 |
| DEER RUN UNIT # 5, | 117 | DR. GATES SUBD UNIT # 1, | 15 |
| DR. GATES SUBD UNIT # 1, | 38 | DR. GATES SUBD UNIT # 2, | 11 |
| DR. GATES SUBD UNIT # 2, | 33 | EAGLE HEIGHTS COMMERCIAL TRACT UNIT # 1 (PHASE I), | 6 |

**Figure 12: The colonias listed next to their total lots/occupied lots.**

One thing that should be noted, occasionally lots would not be listed singly. For example, they would be listed multiply as Lot 1-3, Lot 1&3, or sometimes a series of records would appear with lot designations similar to 1-1, 1-2,1-3,1-4,…,1-19, 1-20. The parsing query was unable to distinguish between those and singly listed lots. Fortunately, these cases were relatively rare since, a manual count had to be done. The Appraisal district was consulted for each of these scenarios, and the action taken for each was:

| Scenario | Action Taken |
|---|---|
| Lot 1-3 * | Count it as 3 lots |
| Lot 1&3 | Count it as 2 lots |
| Lot 1-1, Lot 1-2, …, Lot 1-19, Lot 1-20 | These are each single lots. Combined they used to be Lot 1, but it has been replatted into 20 new sections, hence the designation: Lot 1-1, Lot 1-2,…,Lot 1-19, Lot 1-20. |

* If an improvement was made to a series of consecutive lots, it was treated as one lot with the assumption that the dwelling spanned all three lots, thus making it impossible to split the lot into smaller parts. This was done on the recommendation of the appraisal office.

## D. Health Care Information

The Texas Department of State Health Services has GIS data containing all of the hospital locations within Texas. This allows us to capitalize on the geodatabase structure storing the colonias data. Through the use of a GIS script, the distance to the nearest hospital per colonia was calculated. Now that this calculation is done, the "Identify Tool" in ArcMap can be used on a colonia to determine the distance to the nearest hospital, the hospital's name, address, and source of the hospital data.

An example of the functionality of this data structure is to reclassify the colonias by distance to the hospital. For instance, colonias within 5 miles of a hospital could be colored green, 5-10 miles could be yellow, and 10+ miles could be red.

**Screenshot #13:** Maverick County colonias reclassified by distance to hospital

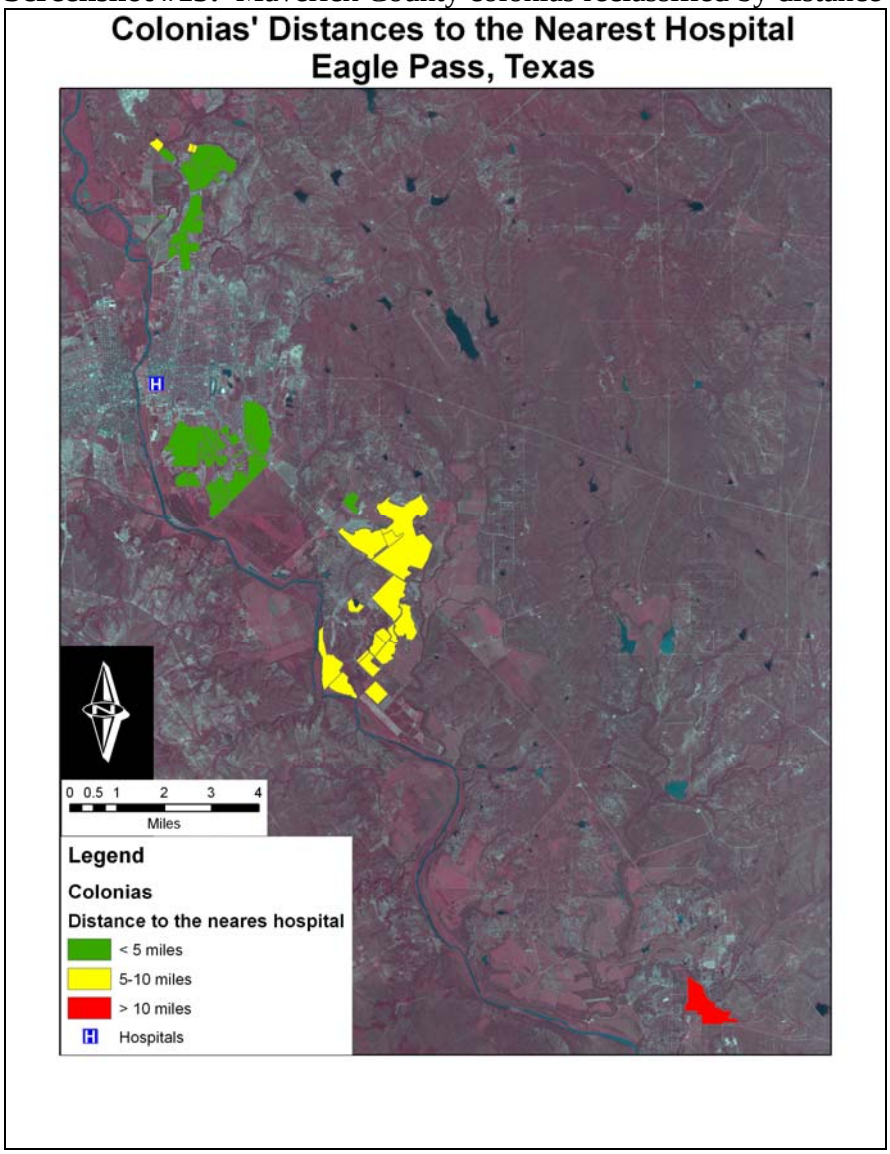



**Figure 13: Eagle Pass is the urban area containing the hospital (marked with an "H").**

## E. Public School Information

The Texas Education Agency (TEA) maintains GIS data concerning the location of all publicly funded schools in Texas, as well as the school district borders. Using the same process described above, the nearest distance to schools are easily calculated. The only difference is that for schools, distances are calculated within school districts by grade level. For instance, when using the "Identify Tool" in ArcMap on the colonia geodatabase, someone can click on a colonia and determine what the closest pre-k school is within their district. They could also find out what the nearest kindergarten, first grade, second grade, and so on, are located. A separate calculation is performed per grade level.

It would have been more convenient to be able to limit it to the nearest elementary, middle, and high schools, however this is impossible. The extra calculations are necessary due to the lack of uniformity in grade ranges among schools. In other words, some elementary schools are pre-k – 5$^{th}$ grade, whilst others are 1$^{st}$-6$^{th}$. There are several variations in grade ranges, so the decision was made to perform the analysis per grade level.

Lastly, all disciplinary campuses and charter schools were removed. The distances were calculated for regular public education institutions only.

# Section VII. Conclusions

This process is still being developed, and as more counties are incorporated into it the more we will learn about what kind of data is available. Keeping local agencies involved makes a border-wide colonia database much more maintainable as well as potentially more accurate. With the dynamic growth in these areas coupled with the dynamic state of lot boundaries, it will take constant vigilance to keep pace with the changes. So far, local agencies have already proven their worth. Local data have helped to create more accurate colonia boundaries and more accurate total lot/occupied lot counts. Also, the use of local agencies to procure data is both simple and repeatable. Once a system is in place, it can easily be duplicated after a specified time interval.

## Section VIII. Appendix

Here are some screenshots showing the improvements done in El Paso.

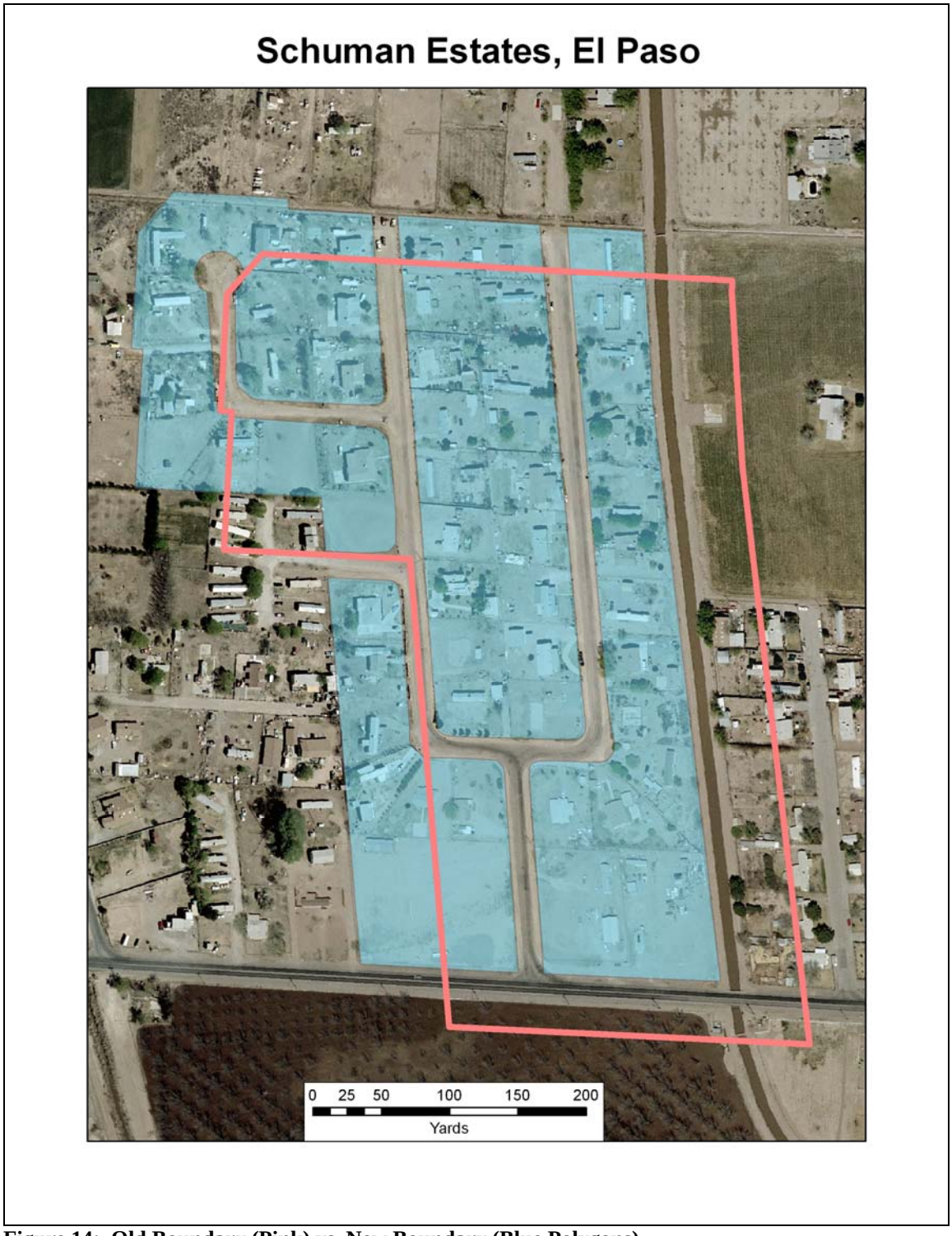



**Figure 14: Old Boundary (Pink) vs. New Boundary (Blue Polygons)**

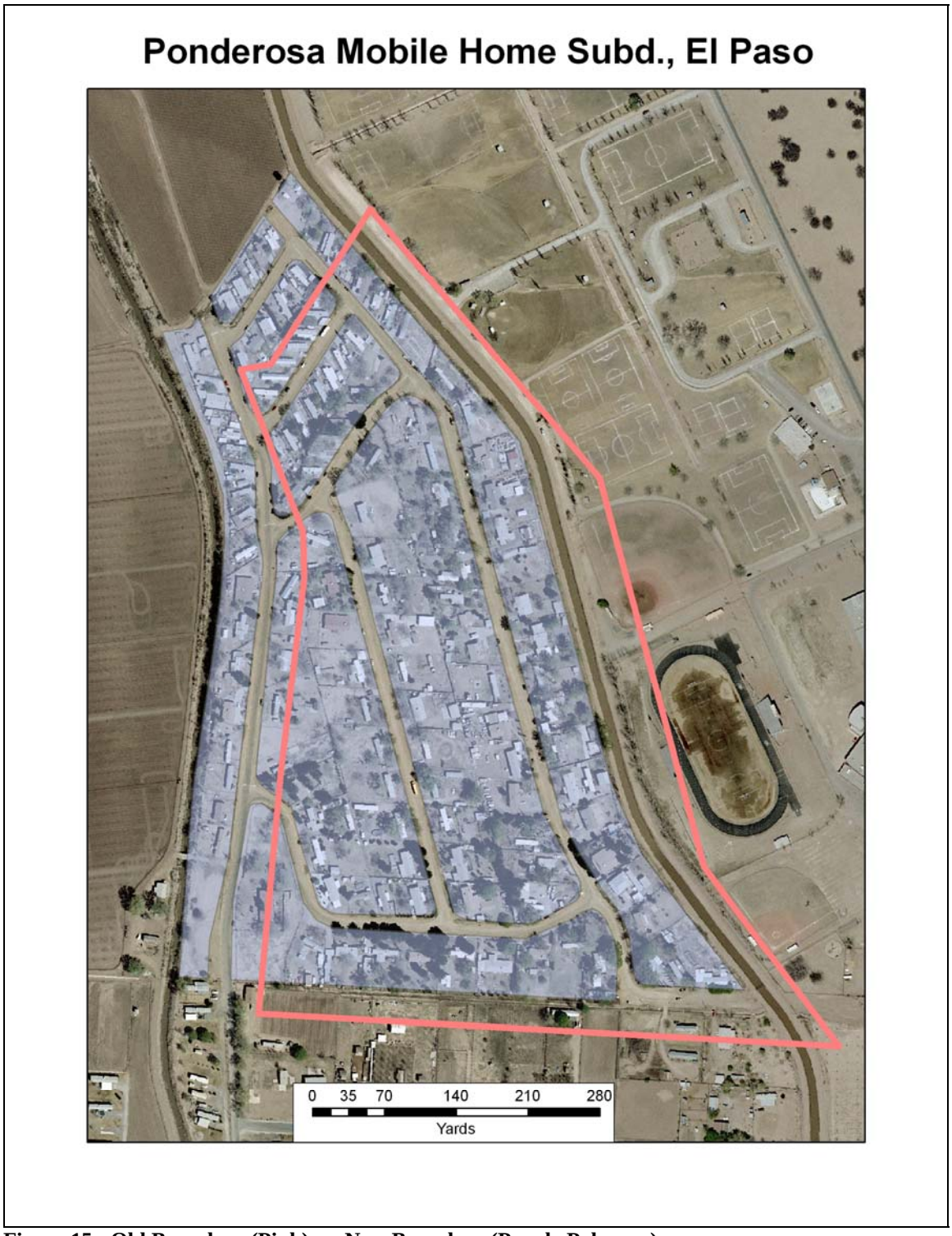



**Figure 15: Old Boundary (Pink) vs. New Boundary (Purple Polygons)**

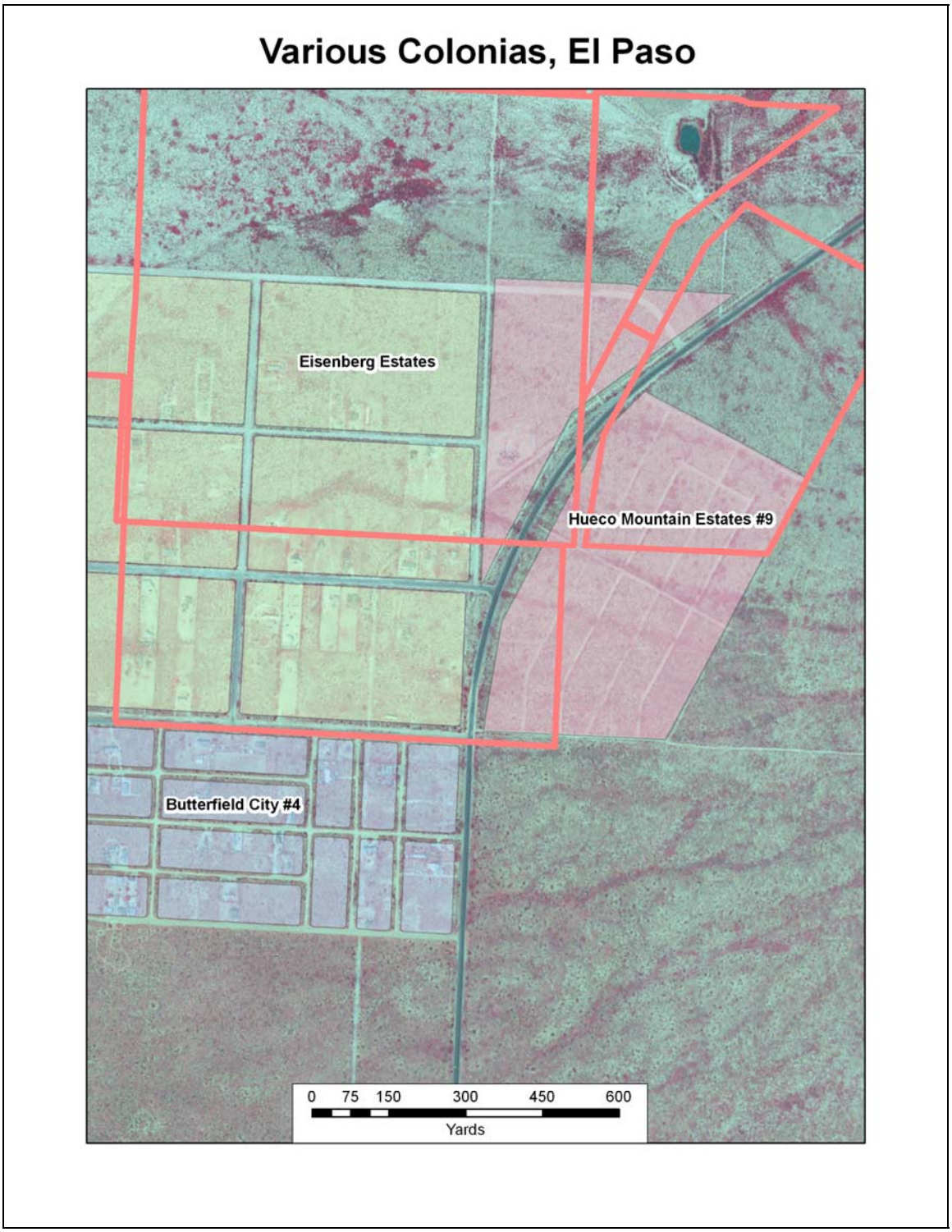



**Figure 16: Old Boundaries (Pink) vs New Boundaries (Colored Polygons)**